

SECTION 7 GUIDELINES - Snake River Basin Office
Slickspot peppergrass (proposed endangered)
Lepidium papilliferum

I. BACKGROUND

Legal Status

Lepidium papilliferum (LEPA) was proposed to be listed as endangered on July 15, 2002 (67 FR 46441) primarily due to habitat loss and modification. This species is threatened by a variety of activities including urbanization, gravel mining, irrigated agriculture, habitat degradation due to cattle and sheep grazing activities, fire and fire rehabilitation activities, and continued invasion of habitat by non-native plant species (Moseley 1994; Mancuso and Moseley 1998).

Species Description

LEPA is an annual or biennial plant in the mustard family (Brassicaceae) that reaches 10 to 30 centimeters (4 to 12 inches (in)) in height. Leaves and stems are pubescent (covered with fine, soft hairs), and the divided leaves have linear segments (Moseley 1994). Numerous small, white, 4-petalled flowers terminate the branches. This species produces small, orbicular (spherical), flattened fruits (siliques) which are approximately 3 millimeters (0.1 in) long. The fertilization mechanism of these fruits is mainly insect pollination by bees (Apidae, Colletidae, and Halictidae families), flies (Syrphidae family), and some beetle species (Dermestidae and Cerambycidae families) (Robertson 2001). The primary seed dispersal mechanism is probably gravity, although wind and water may have a minor role (Moseley 1994). LEPA seeds may be viable in the soil for up to 12 years (Dana Quinney, in litt., 2002).

Population Size/Location

Of 88 known occurrences supporting LEPA, 70 are currently extant (exist), 13 are considered extirpated (extinct), and five are historic (i.e., plants have not been relocated; location information is based on collections made between 1911 and 1974) (Moseley 1994; Mancuso 2000; Shelly Cooke, Idaho Conservation Data Center (ICDC), pers. comm., 2002, ICDC 2002). Occurrences of LEPA can include one to several occupied slickspots within an area determined to be suitable habitat. The total amount of habitat containing interspersed slickspots that have extant occurrences of LEPA is about 5,000 hectares (ha) (12,356 acres (ac)). Only six of the 70 extant occurrences are considered to be high-quality habitat and contain large numbers of the plants (ICDC 2002). The number of LEPA individuals at each extant occurrence ranges from 1 to 3,000 (Mancuso 2000; ICDC 2002).

Like many short-lived plants growing in arid environments, the above-ground number of LEPA individuals at any one site can fluctuate widely from one year to the next depending on seasonal precipitation patterns (Mancuso and Moseley 1998; Mancuso 2001). Flowering individuals represent only a portion of the population and occupied habitat, with the seed bank contributing

the remainder, and apparently the majority, in many years (Mancuso and Moseley 1998). For annual plants, maintaining a seed bank (a reserve of dormant seeds, generally found in the soil) is important for year-to-year and long-term survival (Baskin and Baskin 1978). A seed bank includes all of the seeds in a population and generally covers a larger area than the extent of observable plants seen in a given year (Given 1994). The number and location of standing plants (the observable plants) in a population varies annually due to a number of factors, including the amount and timing of rainfall, temperature, soil conditions, and the extent and nature of the seed bank. The extent of seed bank reserves is variable from population to population, and large fluctuations in the number of standing plants at a given site may occur from one year to the next. Depending on the vigor of the individual plant and the effectiveness of pollination, dozens, if not hundreds of seeds could be produced.

Habitat

LEPA occurs in semi-arid sagebrush-steppe habitats on the Snake River Plain, Owyhee Plateau, and adjacent foothills in southern Idaho. Associated native species include Wyoming big sagebrush, basin big sagebrush, bluebunch wheatgrass, Thurber's needlegrass, Sandberg's bluegrass, and bottlebrush squirreltail. Non-native species frequently associated with LEPA include cheatgrass, tumble mustard, bur buttercup, clasping pepperweed, and crested wheatgrass (Moseley 1994; Mancuso and Moseley 1998).

LEPA is restricted to small depositional microsites similar to vernal pools (generally known as slickspots, mini-playas, or natric sites) that range from less than 1 square meter (m^2) (10 square feet (ft^2)) to about 10 m^2 (110 ft^2) (in diameter) within communities dominated by other plants (Mancuso *et al.* 1998). Slickspot microsites are widespread, but LEPA is limited to one or more series of slickspots covering a relatively small area. These sparsely vegetated microsites are very distinct from the surrounding shrubland vegetation, and are characterized by relatively high concentrations of clay and salt (Fisher *et al.* 1996). The microsites also have reduced levels of organic matter and nutrients due to the lower biomass production compared to surrounding habitat areas. The restricted distribution of LEPA is likely a product of the scarcity of these extremely localized, specific soil conditions, and the loss and degradation of these habitat areas throughout southwestern Idaho.

Summary of Threats

Most sagebrush-steppe habitat that has not been converted to cropland in southwestern Idaho has been degraded by wildfire, livestock grazing and trampling, the invasion of non-native plant species, and off-road vehicle use; these factors continue to threaten all remaining habitat for LEPA (Moseley 1994; Mancuso and Moseley 1998; ICDC 1999; Mancuso 2000). The conversion of the original sagebrush-steppe to annual grasslands and nonnative perennial grasslands has reduced suitable remaining habitat for, and destroyed some LEPA, in addition to fragmenting and isolating extant occurrences (Moseley 1994). Subsequent increased frequency of fire, and the associated invasion of weedy annual plants, are serious range wide threats to the long-term integrity of LEPA habitat and population viability (M. Mancuso, *in litt.*, 1998).

Exotic Plants: The displacement of native plants by non-native species is a major problem in sagebrush-steppe habitats of the Intermountain region (Rosentreter 1994; Ann DeBolt, Bureau of Land Management (BLM), pers. comm., 1999). Widespread grazing by livestock in the late 1800s and early 1900s severely degraded sagebrush-steppe habitat, enabling introduced annual species (especially cheatgrass) to become dominant over large portions of the Snake River Plain (Yensen 1980; Moseley 1994). The invasion of cheatgrass has shortened the fire frequency of the sagebrush-steppe from between 60 to 110 years, to less than 5 years as it provides a continuous, highly flammable fuel through which a fire can easily spread (Whisenant 1990; Moseley 1994; Mancuso and Moseley 1998). The result has been the permanent conversion of vast areas of the former sagebrush-steppe ecosystem into non-native annual grasslands. An estimated 2 to 2.43 million ha (5 to 6 million ac) of sagebrush-steppe in the western Snake River basin has been converted to non-native annual vegetation dominated by cheatgrass and medusahead (Noss *et al.* 1995), primarily due to continued overgrazing and fire. The continued cumulative effects of overgrazing and fire suppression permit the invasion of non-native plant species into slickspot habitats (Rosentreter 1994). LEPA populations typically decline or are extirpated following the replacement of sagebrush-steppe habitat by non-native annuals.

Another problem has been the use of non-native perennial species, such as crested wheatgrass and intermediate wheatgrass, to restore or rehabilitate shrub-steppe habitat after a fire event. Although some LEPA may temporarily persist in spite of these restoration seedings, most occurrences support small numbers of plants (fewer than five per slickspot) and long-term persistence data are unavailable (Mancuso and Moseley 1998). Habitat degradation, fragmentation, and loss of sagebrush-steppe vegetation have occurred throughout the range of LEPA. Popovich (2001) found in his surveys for LEPA in the Inside Desert area on BLM land in 2000 that, generally, slickspots dominated by non-native vegetation had fewer LEPA plants than slickspot sites with greater native vegetation retention.

Livestock Associated Impacts. Livestock trampling of slickspots is one of the main disturbances to slickspot microsites (Mancuso 2001), especially in the spring (approximately April through June) when the soils are moist. Trampling by livestock can physically damage the vegetation that exists there and compact the soil, which greatly accelerates desertification processes through increased soil loss and water runoff (Moseley 1994; D. Quinney and Jay Weaver, Idaho Army National Guard (IDARNG), pers. comm., 1998; J. Klott, pers. comm., 2000; Popovich 2001). This can also lead to the loss of slickspot integrity, particularly from winter through spring when standing water remains for a longer period of time after a rainfall (Belnap *et al.* 1999; Air Force 2000). Livestock effects on unique habitats such as slickspots are magnified in areas where non-native plant invasions and altered fire regimes occur.

Livestock trampling of slickspots can also lead to the invasion or increase of non-native annual species such as cheatgrass, tumble mustard, bur buttercup, and clasping pepperweed into shrub-steppe habitats through transport of the seeds of these species by animals in their feces or hides (Ellison 1960; Pyke 1999). In addition, the presence of livestock in an area with slickspots

generally results in increases in organic debris, such as livestock feces, especially when the slickspots contain standing water. As organic debris is increased, the incidence of non-native species invasion also increases (J. Klott, pers. comm., 2000), leading to the loss of suitable habitat for LEPA.

Wildfire Wildfire is a threat to all known LEPA occurrences throughout its range. As described above, the invasion of cheatgrass has shortened the fire frequency of sagebrush-steppe habitat from between 60 to 110 years, to less than 5 years. Frequent fires are likely to degrade remaining LEPA habitat in the future. For example, 29 of the 40 monitored (73 percent) LEPA occurrences have been completely burned, have a mosaic burn pattern, or have distinct burned and unburned segments (Mancuso 2000). Fire may also indirectly impact LEPA by increasing erosion, resulting in deposit of sediment on slickspots, and subsequently covering plants. Increased sedimentation after a fire may also allow weedy species to invade slickspots (DeBoldt 1999 cited in Air Force 2000).

Fire Rehabilitation Activities. Fire rehabilitation is needed to reduce the invasion of non-native vegetation to burned areas, however, post-fire range restoration efforts also threaten LEPA. Some occupied slickspots have been lost following drill-seedings, but it is often not clear whether fire, seeding, or the combination of the two disturbances caused the disappearance of the species or the slickspot. Slickspots may reform over time after being drilled (Moseley 1994; Noe 1999 cited in Air Force 2000), but it is not known if LEPA populations will remain viable for as long as the slickspot takes to reform (Air Force 2000). In their study examining the effects of drill seeding on LEPA, Scholten and Bunting (2001) found that the density of LEPA individuals was lower on drilled slickspots than on non-drilled sites.

Drill-seeding may have less severe impacts on slickspot habitat than disking the soil, but the success of fire rehabilitation efforts at maintaining slickspots and LEPA varies considerably. Drill-seeding tends to break the linkages between slickspots and can result in slickspots shrinking in size, particularly those that are relatively small (J. Klott, pers. comm., 2000). Seeding methods that cause minimal soil disturbance (e.g., “no till” drills) are available, but have not been regularly used in southwestern Idaho to date (R. Rosentreter, BLM, pers. comm., 1999). In some cases, not seeding burned areas can result in the loss of LEPA occurrences due to non-native weed invasion. In 2001, the BLM modified its rangeland drills used in fire rehabilitation to reduce the seeding depths so the drills would be less damaging to LEPA habitat.

Seeding burned areas with crested wheatgrass, a non-native forage species, or other non-native perennial grasses, has resulted in the destruction of at least one LEPA site (Moseley 1994). Crested wheatgrass is a strong competitor and its seedlings are better than native species at acquiring moisture at low temperatures (Lesica and DeLuca 1998). For example, on the Juniper Butte ETR, approximately 80 percent or 3,708 ha (9,163 ac) of this area is dominated by non-native perennial plant communities as a result of fire rehabilitation efforts (Air Force 1998).

Also, the practice of “green-stripping” or converting native habitat to non-native plant species that are not considered to be very flammable has occurred (Moseley 1994). Since wildfire

prevention and control is a high priority for the BLM and other agencies in southwestern Idaho, potential threats to LEPA habitat associated with these activities are expected to continue.

Herbicide and Pesticide Use. Herbicides and pesticides may negatively impact this species, either directly or indirectly (e.g., via drift). While herbicides may kill individual LEPA plants, pesticide spraying can negatively affect pollinators of LEPA, impacting seed production. Herbicides and pesticides may be used by Federal agency staff (and other parties) in areas such as agricultural areas and roadsides. LEPA could be present in or adjacent to such areas.

Oust, a non-specific herbicide that is toxic to plants in the mustard family, is successful at killing annual plants while having little impact on established perennials (Scholten 2000 cited in Scholten and Bunting 2001). Oust has been used over large areas of BLM lands that contain LEPA habitat as part of fire rehabilitation efforts.

Military Training. Military training activities by the Idaho Army National Guard, the Idaho Air National Guard, and the Air Force have the potential to directly and indirectly impact LEPA. Training activities may crush plants and change the hydrology of slickspots. Military training activities may also indirectly impact LEPA by increasing erosion, resulting in deposit of sediment on slickspots, and subsequently covering plants. Training activities may also generate sparks or cause hot machinery to contact dry vegetation, igniting fires which could reduce or eliminate the suitability of slickspots and the surrounding sagebrush steppe habitat for the species. Import of equipment for use on training areas could also introduce undesirable plant seeds from outside the area.

Off Highway Vehicle Impacts. Off Highway Vehicle (OHV) recreational activities have the potential to directly and indirectly impact LEPA by crushing plants or changing the hydrology of slickspots. OHV activities may also impact surrounding vegetation and increase erosion in the general area, resulting in deposit of sediment on slickspots. OHV recreational activities may also ignite fires as hot machinery comes into contact with vegetation, especially fine fuels such as dried grasses.

Development and Agricultural Conversion. The long-term viability of LEPA occurrences on private land is questionable due to the continuing expansion of residential developments in and around Boise (Moseley 1994). Twenty-eight of the 88 known LEPA occurrences (32 percent) occur either wholly or partially on private lands. Of these, 13 occurrences (46 percent) are known to have been extirpated within the past 50 years (Moseley 1994; ICDC 2002). Urbanization, agricultural conversion, and associated factors such as increased risk of damage or extirpation from fire, trampling, and off-road vehicle use, threaten all existing LEPA occurrences on private land.

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II. GUIDELINES - Protocol for Evaluation Project Effects

Threat: Habitat degradation by the invasion of weedy species, usually resulting from previous or current grazing activities by livestock and/or wildfire.

Resolution: Control exotic species in areas where occupied or potential habitat for LEPA occurs.

Apply specific management practices in allotments to reduce grazing pressure to LEPA habitat (occupied or potential habitat). For example, reduce impacts from livestock grazing by moving animals and/or fencing areas to protect the species. Change season of use (i.e. grazing livestock in fall rather than the spring to avoid trampling impacts during the active growing season for the species). Avoid location of water sources, salt blocks, and fences within 1 mile of known LEPA populations. Any grazing within habitat for this species should be closely monitored to ensure that adverse impacts to LEPA are avoided.

In addition, all areas that are (or will be) grazed on Federal lands containing suitable habitat for LEPA should be surveyed for this species (see attached Rare Plant Survey Guidelines for survey protocol).

Threat: Habitat degradation and direct mortality of plants resulting from military training activities.

Resolution: Avoid impacts by concentrating military activities in previously disturbed areas. Encourage military training activities to include measures to avoid ignition of fires. Encourage use of an equipment cleaning stations to remove seeds from equipment

imported from off site to avoid inadvertent introduction of exotic plant seeds to areas containing LEPA. Any training activities within habitat for this species should be closely monitored to ensure that adverse impacts to LEPA are avoided.

In addition, all areas that are (or will be) used for military training activities on Federal lands containing suitable habitat for LEPA should be surveyed for this species (see attached Rare Plant Survey Guidelines for survey protocol).

Threat: Habitat degradation and direct mortality of plants resulting from prospecting, mining, and borrow pit development/expansion.

Resolution: Reduce and/or reroute vehicular travel over claims. Inform contractors and miners of the species location (as appropriate), and their responsibility for listed species protection.

Federal agencies should ensure that their activities (and the activities that are permitted by such agencies) do not directly or indirectly impact habitat (including occupied and suitable unoccupied habitat) for LEPA. All areas that may be impacted (that contain suitable habitat for LEPA) should be surveyed for this species (see attached Rare Plant Survey Guidelines for survey protocol).

Threat: Habitat degradation and direct mortality of plants resulting from road and/or trail construction and maintenance and off highway vehicle recreation activity.

Resolution: Avoid road and trail development and off highway vehicle route designation in areas containing occupied or potentially suitable unoccupied habitat to reduce impacts from construction, road/trail maintenance, and/or off highway vehicle operation. Restrict OHV activity within occupied LEPA habitat. Conduct surveys in occupied and potentially suitable habitat prior to construction, maintenance, or other ground disturbing activities (see attached Rare Plant Survey Guidelines for survey protocol).

Survey Guidelines

Surveys should be conducted prior to ground disturbing activities and activities described in the “Threats” section of this report (including grazing, herbicide spraying, etc.) in potentially suitable (i.e., Wyoming sagebrush steppe habitats containing slickspots) habitats that are between 2,200 feet and 5,400 feet in elevation in southwestern Idaho along the Snake River Plain and Owyhee Plateau in Ada, Glenn, Canyon, Gem, Elmore, Payette, and Owyhee counties.

Brief Summary of Survey Protocol

- Surveys should be conducted according to the Rare Plant Inventory Guidelines (attached).

- Surveys should be conducted during the peak flowering period, generally mid-May through June. Surveys conducted at other times of year are not reliable and should not be accepted.
- Surveys should be conducted by walking or otherwise closely scrutinizing potential habitat looking for basal rosettes or flowering plants, and should be performed by trained botanists familiar with conducting rare plant inventories. Known populations range in size from fewer than 10 to 1000's of plants. In addition, because these plants may not bloom every year, LEPA may not be visible during a “quick” one-time only survey. Visits during consecutive years may be advisable.
- Any new sites should be mapped and immediately reported to the Conservation Data Center and the FWS (Snake River Basin Office).

Collection

If listed as endangered, collection of LEPA, including seeds, leaves, or any parts thereof, would require a Section 10 permit issued by FWS. If listing occurs, only designated FWS staff members and “agents of the Service” could collect LEPA individuals. “Agents of the Service” may include CDC staff that are under a Section 6 contract with FWS. Collecting should NOT be encouraged for biologists in other agencies or private individuals.